

MINES: Mercury and Other Substances Leave a Legacy of Toxic Waste

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"We've had this idealized picture of the Wild West and the Gold Rush and it's part of our western heritage," said Ken Weiner, an environmental attorney in Seattle. "But this rich history has also left its environmental mark."

"Areas where mines used to be are places people build houses today, where kids play and where wildlife roams," Weiner said. "Chemicals and heavy metals become exposed and people and animals end up being affected by them."

These old diggings often receive scant attention, authorities concede, because they are in remote areas where they pose more of a threat to wildlife than to people.

But the Comstock Lode toxic waste site stands out, both for the vast area of contamination and for the region's historical significance.

During its heyday between 1860 and 1900, more than \$400 million in gold and silver bullion came out of the Comstock Lode. Ore from Nevada helped finance the Civil War and the construction of San Francisco.

Gold was discovered in Nevada in 1849 near Dayton by Abner Blackburn, a pioneer practicing his gold panning in the Carson River. He continued on to the more famous Mother Lode in California, but during the next decade a handful of other miners dug away at the mountain above Dayton.

In 1859, a group of miners found gold on the site of what was to become Virginia City. Henry Comstock, a prospector whose main labor consisted of staking as many claims as possible, showed up to assert his rights to the mine and was awarded a partnership. The rich lode under the town came to bear his name, although he sold his share within months and died a poor man.

The Comstock claim proved to contain a fair amount of gold, but the prospectors were hampered by an abundance of seemingly worthless black ore. They gave away souvenirs of the odd rock until an assayer in Placerville tested a sample and found that it was rich in silver.

The revelation touched off a stampede of thousands of miners to the Nevada territory, and the Carson Valley quickly became one of the most industrialized regions west of the Mississippi. The Virginia and Truckee Railroad was laid to carry the ore.

At least 75 large, sophisticated mills were built in Virginia City, Dayton and along the Carson River, where the water provided a steady source of power. The mills were used for everything from processing mercury-laden mine waste to processing gold and silver ore. Among the workers earning \$10 a week in the mills was young Samuel Clemens, who was roaming the territory and had yet to begin his writing career in Virginia City under the name Mark Twain.

In "Roughing It," Twain later described the laborious process of refining the ore. First, workers broke up the ore with sledgehammers and shoveled it into a great iron box, where it was pulverized by huge "stamps." The dust was mixed with water, quicksilver and salt and heated in giant tubs.

The quicksilver "liberated" the gold and silver particles and held on to them," Twain wrote, yielding an amalgam of gold, silver and mercury. Ultimately, the blob of metal was heated again until the quicksilver evaporated, leaving pure gold and silver.

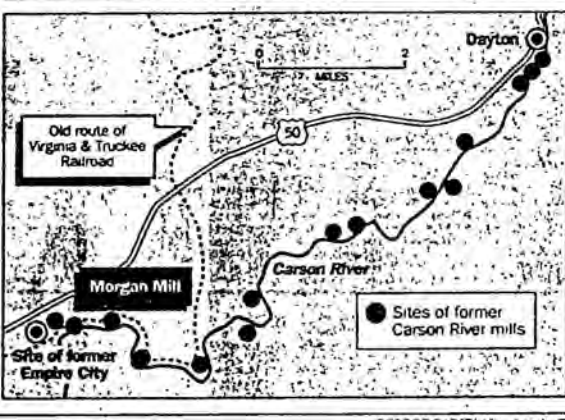
"There is nothing so aggravating as silver milling," Twain wrote of his experience. "There never was any idle time in that mill. There was always something to do. It is a pity that Adam could not have gone straight out of Eden into a quartz mill to understand the full force of his doom."

Twain lasted a week on the job, slightly longer than the gold ring on his finger. The ring "crumbled to pieces," he wrote, when it came in contact with the mercury.

Today, the desert has reclaimed most of the mills; only a few ruins remain. In attempting to understand the spread of mercury

A Problem Legacy

The historic Comstock Lode mines that produced silver and gold in the 19th Century have left northern Nevada with a modern problem: mercury contamination in the Carson River and Lahontan Reservoir, the state's largest. Mercury was used to process ore in the mines romanticized in Mark Twain stories. The Environmental Protection Agency has designated 100 miles of the river as a Superfund cleanup site.



GEORGE CAREY / Los Angeles Times

through the Comstock region, state and federal scientists are combing through historic records and tracing the boundaries of the old mills.

Soil samples and tests of fish show that the heaviest concentration of mercury is in the Carson River system between Dayton and the Stillwater National Wildlife Refuge, about 100 miles downstream.

Even today, with each heavy rain, more mercury washes out of the desert and into the Carson.

Once in the river, the mercury binds to particles and flows downstream as sediment. In some cases, bacteria act on the metal to alter its chemistry and create a more hazardous form, that is readily absorbed by animals.

Since 1915, when the Carson River was dammed to irrigate crops, Lahontan Reservoir has acted as a mercury sink, capturing nearly all contamination as it heads downstream. The reservoir, Nevada's biggest artificial lake, is a popular fishing spot.

Even the early Romans knew that mercury was dangerous stuff; their graves in the cinnabar mines became ill if forced to work too many hours a day.

More recently, scientists have discovered that even relatively low doses of organic mercury can cause illness and that the element accumulates in animals. The higher a species is in the food chain, studies show, the greater its risk from mercury poisoning.

"Mercury is extremely persistent," said James J. Cooper, a Nevada state water quality supervisor who has studied the Comstock region. "Bioaccumulation in the food chain is the biggest problem."

Fish sampled in the Carson drainage have shown levels of mercury as high as 21.5 parts per million, according to a state study. The "action level" established by the federal Food and Drug Administration as too high for regular human consumption is 1 part per million.

In some jurisdictions, such high mercury levels in fish would prompt health officials to prohibit

fishing. But in Nevada, fishing spots are posted with signs warning people not to eat large quantities of their catch. Children and pregnant women are urged not to eat any.

State and federal officials say they know of no cases of illness from mercury in the Carson Valley, but acknowledge that no one has performed a comprehensive health study of the population.

Mercury poisoning can cause numbness, bright red hands and feet, subtle neurobehavioral changes and impaired brain function. More serious mercury poisoning was once common in the hat-making industry and was exemplified by the flighty madmen in Lewis Carroll's "Alice's Adventures in Wonderland." In severe



James J. Cooper, a Nevada water quality supervisor, at entrance to a suspect mine in Comstock region.

doses, mercury can cause birth defects or death.

In the little desert town of Dayton, about 10 miles east of Carson City, traces of the Old West still abound. It is the kind of town where the S&S Mini-Market sells gas, beer and .38-caliber revolvers.

On the main street, the crumbling wall of the Pony Express station is wedged between two slightly newer buildings. Nearby are the ruins of the mills that once dominated Nevada's second-oldest town.

And there is the quicksilver dust that, until recently, blew through town on windy days.

The idea that mercury might pose a health threat arose when residents questioned whether there was contamination in the mounds of mine waste on a lot in the middle of town nearly the size of a football field.

The EPA tested the soil and found levels of mercury as high as 670 parts per million in the tailings across the street from Stott's house and in the soil of a small playground next to the mine waste.

The EPA also sampled mine tailings just outside town that were popular for off-road motorcyclists and found the highest mercury levels of all—1,200 parts per million. The EPA safety standard for mercury in soil is 25 p.p.m.

"We have to presume the worst," said Sean Hogan, the EPA project manager for the Comstock Lode cleanup. "If these people were out there two hours a day, three days a week, 1,200 p.p.m. is adequate reason to be alarmed." In all, 15,000 tons of contaminated soil are being removed.

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A Lethal Relic of the Old West

Mercury and other substances used by 19th-Century miners have left a legacy of toxic waste at a dozen sites. At the Comstock Lode, residents assess the threat.

By RICHARD C. PADDOCK
TIMES STAFF WRITER

DAYTON, Nev.—For years, young Levi Stott loved to ride his bike in the dusty mounds of 19th-Century mine tailings across the street from his house.

But his fun ended a year ago when toxic cleanup workers in white Tyvek suits arrived in this historic mining town, scooped up the hillocks and hauled them away. The waste, left from the legendary Comstock Lode mines where Mark Twain first made his name, was contaminated with levels of mercury 28 times higher than the federal safety standard.

"Me and my friends used to ride our bikes in it every day," the 16-year-old said. "We used to come home all covered in white dust. I'm a little bit worried. But I'm still here, I guess."

The stark desert of the Carson Valley, once alive with the clamor of prospectors seeking their fortunes, is haunted by about 15 million pounds of mercury left when the mining boom went bust around 1900.

Poisonous quicksilver, used in the old mills to extract gold and silver from the ore, lingers in mine tailings, in remote desert washes, in Nevada's largest reservoir and in a 100-mile stretch of the Carson River.

The romantic region of the Comstock Lode is a federal toxic Superfund site that defies government efforts to clean it up. "You go out and look at it and on the surface it looks fine," said Glenn Miller, a professor of environmental and resource sciences at the University of Nevada, Reno. "But if you start looking at the chemistry, you see it's a serious problem. The concern is that this problem is so intractable not much can be done."

It is a bitter legacy found across the western states. The Comstock Lode is just one of a dozen mining regions of the Old West considered so hazardous that they have been placed on the Superfund list of national priorities for cleanup.

From Silver Bow Creek in Montana to Smuggler Mountain in Colorado, from Bunker Hill in Idaho to Iron Mountain in California, abandoned 19th-Century mines still bleed cadmium, lead, zinc, copper, arsenic and other poisons into the environment.

Thousands of other obsolete workings and mills continue to produce hazardous pollution throughout the West, the federal Environmental Protection Agency estimates.

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ed soil were removed from the three locations and taken to a modern mill nearby, where the tailings were processed using cyanide to remove the mercury, as well as any remaining silver or gold. In addition, new soil was placed over the playground dirt.

In Dayton, where the community has lived with mercury for more than 130 years, some people were more irritated by outsiders' interference than worried about the health threat.

"Most of the townspeople are not very concerned about it," said real estate broker Sandy Delaski. "They've lived here for years and nobody suffered any ill effects from it."

Delaski was more interested in talking about Dayton's ritzy new

subdivision, with a golf course designed by Arnold Palmer, rising out of the desert on the far side of the river.

But others are not taking the threat so lightly. Angela Richardson, who lives in a run-down house across from the park, is still afraid to take her three small children to the playground despite the cleanup effort.

"I think the mercury's pretty much everywhere around here," she said. "I don't take them over to that park. I don't trust it for my kids."

The mercury contamination is so vast that experts hold little hope of cleaning it all up. Their primary goal is to eliminate sources of mercury that are entering the water system and to remove hot

spots—such as the tailings in Dayton—that pose the greatest danger to humans.

For now, the EPA is mapping out the historic mill sites and plans to conduct further sampling of soil and fish to determine the extent of mercury pollution.

But the cost of cleanup efforts in the Carson River could be so tremendous that it may not be justified by the level of risk to humans. Officials may be compelled to leave well enough alone and rely on signs warning people not to eat large quantities of fish.

"We can go after new sources of mercury entering the river," said Cooper, the Nevada state water quality specialist. "But it is likely there is not much we can do with mercury that has already entered the aquatic system."

